

DATA MANAGEMENT PLAN

(1) Types of data, samples, physical collections, software, curriculum materials, and other materials to be produced in the course of the project

Data generated from this project will be experimental. Results from protein extract, culture and field experiments will be shared with the scientific community either as ancillary data through publication or in public repository such as the Biological and Chemical Oceanography Data Management Office (<http://bco-dmo.org>) or the Dryad database, (<http://datadryad.org>). Analysis tools or schemes will be made available to the scientific community through a project website, publications or upon request. Samples from this project will be made available, as requested, to the wider scientific community if this does not interfere with the goals of this project. Educational materials will be made publically available through a project website, Earth2Class (<http://earth2class.org/site>), and through broader educational material repositories (e.g. <http://www.dlese.org>; <http://ucarconnect.ucar.edu/learning-resources>; <http://web.vims.edu/bridge>; and <http://opened.creativecommons.org>). The educational game will additionally be distributed on a free, open-source app for tablets and smartphones (e.g. popular app stores).

(2) Standards to be used for data and metadata format and content

Following standard biological, chemical and physical and oceanographic practices, all data will be collected using certified reference materials (CRMs) where available. These include CRMs for nutrient analyses (NRC Institute for National Measurement Standards, <http://www.nrc-cnrc.gc.ca/eng/services/inms/reference-materials.html>), and chlorophyll (http://www.turnerdesigns.com/t2/doc/appnotes/998_0058.html) among others. Where CRMs are not available, other best practices will be used including using internal standards or appropriate controls. Data will be formatted in accordance with archival database repositories using requested formats.

(3) Policies for access and sharing including provisions for appropriate protection of privacy, confidentiality, security, intellectual property, or other rights or requirements

Using established communications channels (e.g. Cisco telepresence, Skype, data servers, etc.) the PI, collaborators, students, postdoc and staff will have equal access to all data generated from this project as is reasonably achievable. Data and communications will be housed and conducted on secure data servers and channels or located in locked rooms while under active analysis. When appropriate and ready for a wider distribution, data and project products (i.e. papers, analysis tools, etc.) will be publically disseminated using the above channels. Given the nature of this research, security or intellectual property rights are not a concern. Data access rights will follow standard NSF project management rules.

(4) Policies and provisions for re-use, re-distribution, and the production of derivatives

Once publically disseminated to the archival databases described above, all data and research products will be available for unrestricted re-use or re-distribution. Acknowledgement of the original source of the data will be requested, but not required for its use.

(5) Plans for archiving data, samples, and other research products, and for preservation of access to them

As outlined above, all data and research project products will be archived to publically accessible database repositories or scientific journals. All samples will be archived in deep-freezers (-20°C or -80°C) for the duration of the project and while manuscripts or data quality control are underway. Samples will be stored at the PI's Institution for the duration of the project. Beyond this period, samples will be stored as required by the project or for the period that they are still valuable (i.e. have not degraded beyond their utility).